

Research Highlights

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Atomic Switch Reaching Outer Space

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17 Feb, 2017

10-year journey of the atomic switch in nanospace is finally reaching practical use in space satellites several thousand kilometers above earth

日本発の独創的なITデバイス「原子スイッチ」
その実用化を祝う国際シンポジウム

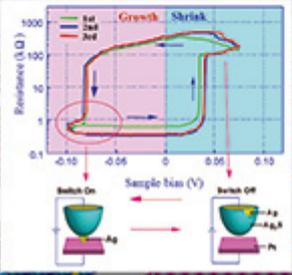
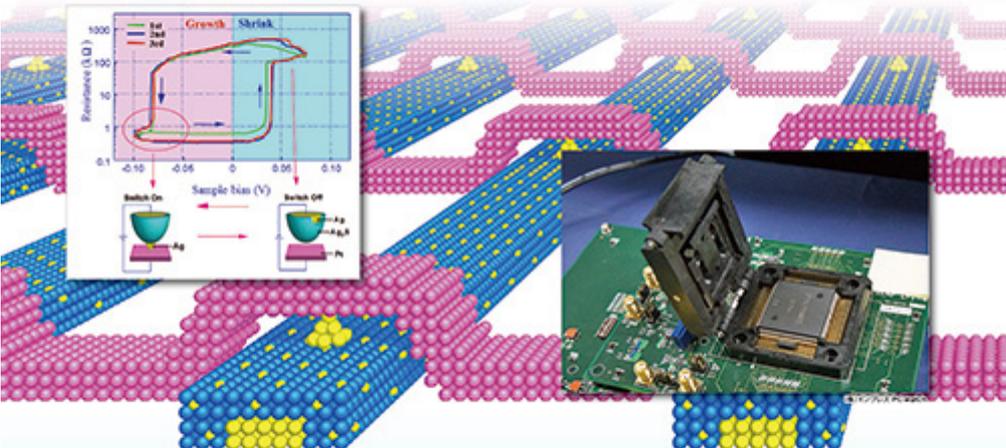


MANA/NIMS主催 NEC協賛 JST後援

International Symposium on Atomic Switch: Invention, Practical Use and Future Prospects

Symposium Chair : M. Aono

Speakers : J. Gimzewski (UCLA), T. Hasegawa (Waseda Univ.), H. Hihara (NEC), S-J. KIM (NIMS),
T. Nakayama (NIMS), T. Sakamoto (NEC), K. Terabe (NIMS), T. Tsuchiya (NIMS),
T. Tsuruoka (NIMS), I. Valov (Research Centre Jülich), S. Watanabe (Univ. Tokyo)
[Alphabetical order]

March 28, 2017

Venue: Meeting Room "SUBARU",
Okura Frontier Hotel Tsukuba, Tsukuba



In 2001, the atomic switch was invented through an unconventional combination of a state-of-the-art scanning tunneling microscope (STM) and a small piece of Ag₂S ion/electron mixed conductor. Generation and annihilation of metallic nanofilament in a tunnel gap (about 1 nm) enabled quantized and nonvolatile conductance switching with a low operation voltage that is impossible with other methods. The atomic switch marked a beginning of a new paradigm, namely nanoelectronics achieved by ions, which was succeeded in the derivative technologies: memristor and resistive random access memory. In conventional semiconductor technology, ions had long been nothing but troublesome impurities causing unstable operations; however, they are now playing a leading role in next-generation information and communication technology.

Masakazu Aono (Director-General, MANA) and his co-workers invented the atomic switch and have been developing the technology with several researchers at MANA/NIMS for about 10 years in collaboration with NEC Corp. Now, the atomic switch has come into practical use as the “NEC AtomSW-FPGA (Atomic Switch-Field Programmable Gate Array),” which will soon be used in robots and space satellites.

To celebrate the practical use of the atomic switch, a memorial symposium will be held. At the symposium, speakers will present information about how the atomic switch has begun to be used for brain-type information processing and for completely novel functional nanodevices as well. This symposium will be useful for all scientists and engineers who are interested in nanoscale devices in relation to AI and IoT. Participation in this symposium is strongly encouraged. More information on the symposium is available at the following website:

<http://www.nims.go.jp/mana/atomswitch2017/>

Contact information

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